

# Recent multiple sexual partners and HIV transmission risks among people living with HIV/AIDS in Botswana

Seth C Kalichman, Dolly Ntseane, Keitseope Nthomang, Mosarwa Segwabe, Odireleng Phorano, Leickness C Simbayi

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See end of article for authors' affiliations

Correspondence to: Seth C Kalichman, Department of Psychology, 406 Babbidge Road, University of Connecticut, Storrs, CT 06269, USA; seth.k@uconn.edu

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**Background:** HIV prevalence in Botswana is among the highest in the world and sexual networking patterns represent an important dimension to understanding the spread of HIV/AIDS.

**Aim:** To examine risk behaviour associated with recent multiple sexual partnerships among people living with HIV/AIDS in Botswana.

**Methods:** Confidential brief interviews were administered to 209 HIV positive men and 291 HIV positive women recruited conveniently from HIV/AIDS support groups and antiretroviral clinics. Measures included demographics, duration of HIV diagnosis, sexual partnerships, condom use, and HIV status disclosure.

**Results:** The response rate was 63% and 309 (62%) participants were currently sexually active, of whom 247 (80%) reported only one sex partner in the previous 3 months and 62 (20%) reported two or more partners during that time. Condom use exceeded 80% across partner types and regardless of multiple partnerships. Steady sex partners of participants with multiple partnerships were significantly less likely to be protected by condoms than steady partners of individuals with only one sex partner. Individuals with multiple sex partners were also significantly less likely to have disclosed their HIV status.

**Conclusions:** Multiple sexual partnerships, many of which are probably concurrent, are not uncommon among sexually active people living with HIV in Botswana. HIV prevention is needed for all individuals who are at risk and assistance should be provided to HIV infected people who continue to practise unprotected sex with uninfected partners or partners of unknown HIV status.

The HIV/AIDS epidemic in sub-Saharan Africa is the most advanced in the world. In Botswana as many as one in three people is infected with HIV.<sup>1</sup> Life expectancy in Botswana has decreased to 34 years and Botswana is now experiencing negative population growth.<sup>2</sup> Multiple factors contribute to the rapid and expansive amplification of HIV in southern Africa, such as the time that HIV has been in Africa, conditions of poverty that foster the spread of HIV, poor health care, co-occurring epidemics of other sexually transmitted infections (STIs), limited access to condoms, and sexual networking patterns, including concurrent sex partners. In Botswana, as many as 23% of adults report having had sexually concurrent relationships and as many as 7% at any given time are in concurrent sexual relationships.<sup>3</sup> Empirical studies show that multiple and concurrent sex partners may be especially important in promoting HIV transmission. Sexual concurrency is associated with clustering of sexual risk behaviours and the synergistic effects of other STIs on HIV transmission.<sup>4–9</sup> Although sexual concurrency is not the only factor propelling the African AIDS crisis,<sup>10</sup> multiple concurrent sex partners clearly have the potential to accelerate the spread of HIV beyond serial monogamous relationships.<sup>11</sup>

Multiple and concurrent sexual partnerships have been studied in relation to individuals who are not known to be HIV infected and their sexual networks. However it is now established that as many as one in three people living with HIV/AIDS continues to practise HIV transmission risk behaviours after testing HIV positive,<sup>12</sup> including HIV infected individuals in southern Africa.<sup>13</sup> Multiple sexual partnerships among people living with HIV/AIDS may be an important element in further understanding the behavioural dynamics of the southern African HIV/AIDS epidemics. To our knowledge, there are no studies yet of multiple partnerships or sexual concurrency among people living with HIV/AIDS in Africa.

The current study was conducted to examine multiple sexual partnerships among people living with HIV/AIDS in Botswana. Men and women attending HIV related support groups and antiretroviral (ARV) clinics completed confidential behavioural surveys. We hypothesised that a majority of people living with HIV/AIDS would be sexually active and that a significant number of people with HIV/AIDS would report engaging in HIV transmission risk behaviours with uninfected partners. Based on previous research<sup>5</sup> we also hypothesised that at least one third of sexually active HIV positive people would report multiple sexual partners.

## METHODS

### Participants

The participants were 209 HIV positive men and 291 HIV positive women conveniently sampled from HIV related support groups (66%) and ARV clinics (34%) in Gaborone, Botswana. Participants lived in both rural (n = 203, 41%) and urban (n = 297, 59%) areas.

### Measures

Participants completed brief confidential interviews administered by field staff. Measures included demographic and health characteristics, HIV status disclosure, and sexual risk and protective behaviours within sexual partnerships.

### Demographic and health characteristics

Participants reported demographic characteristics including age, race, employment status, whether they live in a city or rural area, and marital status. For health status, we asked participants whether they were currently taking ARVs and how many years had elapsed since they had tested HIV positive.

**Abbreviations:** ARV, antiretroviral; STIs, sexually transmitted infections

## HIV disclosure

To assess HIV status disclosure history, we asked participants whether they had ever disclosed their HIV status to anyone. In addition, we asked whether participants had disclosed their HIV status to specific sex partners within the partner specific assessment (see below).

## Sexual risk behaviours and partners

We used a partner by partner approach to assess sexual risks and behaviours over the previous 3 months. For each of up to five sexual partners in the previous 3 months, a detailed brief interview asked about the relationship status of each partner; whether the partner was “a steady partner,” defined as someone like a spouse or a boyfriend or girlfriend or “a casual partner” defined as any sex partner not considered to be a steady partner, such as a casual acquaintance, friend, etc. Participants were then asked whether they or their partner had used alcohol or other drugs before sex, the number of times they had engaged in vaginal and anal intercourse, and the number of intercourse occasions in which condoms were used during that time period, separately for each partner. Responses were collected for intercourse with and without condoms using open response formats to reduce arbitrary anchor biases.<sup>14, 15</sup> We also computed the proportion of intercourse occasions that were protected by condoms using the formula (frequency of intercourse with condoms/total frequency of intercourse). In addition to yielding the continuous proportion of intercourse occasions that were protected, we dichotomised whether condom use was consistent (100%) or inconsistent (<100%) for each partner.

We defined participants as either having one or multiple sex partners in the past 3 months. Although we did not capture overlapping times of partnerships, we assume that sexual concurrency is likely in such a brief time, especially when multiple partners occur in the context of steady relationships. Assessing sexual behaviour at the partner level allowed for the tabulation of disclosure and sexual risk and protective behaviours by partner type (steady versus casual) for people with one and people with multiple sex partners.

## Procedures

Participants were recruited from AIDS related services in Gaborone, Botswana, and its surrounding communities. All surveys were administered in Setswana, the native language of Botswana. Ten HIV positive field workers who were open about their HIV status and fluent in Setswana administered the surveys using a face to face interview. Participants were not paid any monetary incentive for completing the survey.

## Data analyses

Analyses were conducted in two steps. Firstly, we compared participants who were and participants who were not sexually active in the 3 months before the survey. These comparisons were performed to describe the relative differences of sexually active and non-sexually active people living with HIV/AIDS. In a second step, we compared sexually active participants who reported only one sex partner in the past 3 months with participants who had two or more sex partners in that time. These analyses included comparisons on demographic and health characteristics, disclosure of HIV to steady/regular and non-steady/casual sex partners, and sexual practices. Logistic regressions were performed to obtain unadjusted odds ratios. We then conducted multivariate logistic regression analysis between participants with one sex partner and those with multiple partners as the dependent variable, simultaneously entering demographic and health characteristics, sex partner characteristics, and sexual behaviours that were significant in

unadjusted analyses as predictor variables. For the multivariate analysis, only non-redundant and non-overlapping variables were included, such that condom use within partner types was included rather than condom use for all partners and global HIV disclosure was used rather than disclosure to specific partners. All analyses were conducted using logistic regressions, reporting odds ratios with 95% confidence intervals (95% CI).

## RESULTS

In all, 800 people were invited to complete surveys of whom 600 agreed. One hundred surveys were not fully completed, yielding 500 usable surveys; 63% completed response rate. Of the 500 participants who completed surveys, 309 (62%) were sexually active in the 3 months before the survey. Table 1 shows the demographic and health characteristics of participants who were not sexually active and those who were sexually active. Comparisons showed that individuals who were sexually active were younger than those who were not sexually active ( $p < 0.01$ ) and there were no other significant differences. All further analyses focus on the 309 sexually active participants.

Among the 309 sexually active participants, we found that 75 (24%) reported engaging in vaginal or anal intercourse without condoms in the previous 3 months. In terms of sexual partners, 247 (80%) participants indicated having only one sex partner in the past 3 months and the remaining 62 (20%) had two or more sex partners during that time, of whom 16 participants had three or more recent sex partners.

## Demographic and health characteristics

Comparisons of individuals with one sex partner to those with multiple sex partners did not indicate any significant differences in age, gender, urban versus rural place of residence, employment status, marital status, or years diagnosed with HIV infection. Individuals with multiple sex partners were significantly less likely to be taking ARV medications ( $OR = 0.41$ ,  $p < 0.01$ ) and were significantly more likely to have not disclosed their HIV status to anyone in their lives ( $OR = 4.42$ ,  $p < 0.01$ ; see table 2).

## Sexual partners

Among the 247 participants who had one sex partner in the previous 3 months, 168 (68%) identified that person as a steady/regular sex partner and 79 (32%) identified the person as a non-steady/casual partner. For the 62 participants with multiple sex partners, 66 of their 140 total partners (47%) were identified as steady/regular and the remaining 74 (53%) were identified as non-steady partners. Table 2 shows the HIV statuses of both steady and non-steady partners among participants with one partner and those with multiple partners. For individuals with one steady partner, 56% indicated that their partner was HIV positive, 24% indicated their partner was HIV negative, and 20% did not know the HIV status of their steady partner. In contrast, 29% of the steady multiple partners were HIV positive, 39% were HIV negative, and 32% were of unknown HIV status. In addition, 91% of participants with only one sex partner had disclosed their HIV status to their steady partners, whereas 51% of participants with multiple sex partners had disclosed to their steady partners.

For non-steady partners of participants who had only one partner, 38% were HIV positive, 6% were HIV negative, and 56% were of unknown HIV status. For participants with non-steady multiple sex partners, 5% had HIV positive partners, 17% had HIV negative partners, and 78% had unknown HIV status partners. With respect to HIV disclosure, 59% of participants with one non-steady partner had disclosed to that person, whereas only 21% of participants with multiple partners had disclosed to their non-steady partners.

**Table 1** Demographic and health characteristics of non-sexually active and sexually active people living with HIV/AIDS

	Not currently sexually active (n = 191)	Currently sexually active (n = 309)	OR (95% CI)
	No (%)	No (%)	
Men	74 (39)	135 (44)	Reference
Women	117 (61)	174 (56)	1.22 (0.84 to 1.77)
Urban	120 (63)	177 (57)	Reference
Rural	71 (37)	132 (43)	0.79 (0.55 to 1.45)
Primary education	65 (34)	91 (29)	0.51 (0.92 to 1.18)
Employed	63 (33)	128 (41)	1.47 (0.98 to 2.09)
Unmarried	138 (72)	175 (56)	0.94 (0.84 to 1.03)
Years HIV diagnosed			
1 or less	70 (37)	116 (38)	Reference
2-3	64 (34)	102 (33)	1.1 (0.56 to 2.08)
4-5	38 (20)	62 (20)	1.0 (0.54 to 2.01)
6 or more	19 (9)	29 (9)	1.0 (0.53 to 2.16)
Taking ARVs	114 (60)	173 (56)	0.86 (0.59 to 1.23)
Age (mean) (SD)	34.1 (10.3)	31.3 (7.7)	0.96** (0.94 to 0.98)

ARV, antiretroviral. Significance defined as \*\*p&lt;0.01.

### Sexual risk and protective behaviours

With respect to substance use in the context of sex, participants with multiple partners did not differ from participants with one partner in their use or their partner's use of substances in sexual contexts. Results showed that participants with one sex partner and those who had multiple sex partners did not differ in their unprotected intercourse in the previous 3 months (see table 3). For both groups, more than 80% of intercourse occasions were protected by condoms. However, groups differed significantly in their consistent (100%) use of condoms, with consistent condom use significantly more likely with steady partners of participants with only one partner than with steady partners of participants with multiple partners (p<0.01). In addition, the proportion of condom use was greater with the steady partners of participants reporting only one partner (p<0.05).

### Multivariate model

Multivariate logistic regression with having one sex partner or having multiple sex partners entered as the dichotomous dependant variable and predictors entered simultaneously with p<0.05 significance level for inclusion showed that HIV status disclosure (OR = 2.52, p<0.01, 95% CI: 1.09 to 5.84), taking ARVs (OR = 0.46, p<0.01, 95% CI: 0.24 to 0.88), and consistent (100%) condom use (OR = 0.30, p<0.01, 95% CI: 0.15 to 0.60) remained significant when simultaneously entered into the model.

### DISCUSSION

The current study hypotheses were confirmed with a majority of people living with HIV/AIDS reporting sexual activity and one in five reporting multiple sex partners, many of whom were probably concurrent. Similar to past research, we found that multiple partners were associated with other risk behaviours

**Table 2** Demographic and health characteristics, HIV disclosure, and partner statuses among sexually active HIV positive men and women with one or multiple sex partners

	One partner (n = 247)	Multiple partners (n = 62)	OR (95% CI)
	No (%)	No (%)	
Men	104 (42)	31 (50)	Reference
Women	143 (58)	31 (50)	1.37 (0.78 to 2.40)
Urban	138 (56)	39 (63)	Reference
Rural	109 (44)	23 (37)	1.33 (0.75 to 2.37)
Primary education	77 (32)	14 (23)	1.55 (0.80 to 2.98)
Employed	98 (40)	32 (48)	1.42 (0.82 to 2.49)
Unmarried	216 (87)	56 (90)	0.90 (0.66 to 1.23)
Years HIV diagnosed			
1 or less	90 (36)	26 (42)	Reference
2-3	88 (36)	14 (23)	1.10 (0.41 to 3.00)
4-5	46 (19)	16 (26)	0.61 (0.21 to 1.76)
6 or more	23 (9)	6 (10)	1.33 (0.46 to 3.86)
Taking ARVs	149 (60)	24 (39)	0.41** (0.23 to 0.73)
Not disclosed HIV to anyone	18 (7)	16 (26)	4.42** (2.10 to 9.31)
Steady sex partner (n)	168	41	
HIV positive	94 (56)	12 (29)	0.28** (0.13 to 0.61)
HIV negative	41 (24)	16 (39)	1.78 (0.86 to 3.69)
Unknown status	33 (20)	13 (32)	1.69 (0.78 to 3.66)
Disclosed to partner	153 (91)	21 (51)	0.22** (0.09 to 0.58)
Non-steady sex partner (n)	79	58	
HIV positive	30 (38)	3 (5)	0.06** (0.01 to 0.25)
HIV negative	5 (6)	10 (17)	1.71 (0.49 to 5.89)
Unknown status	44 (56)	45 (78)	2.50** (1.18 to 5.27)
Disclosed to partner	47 (59)	12 (21)	0.41* (0.17 to 0.95)

ARV, antiretroviral. Significance defined as \*p&lt;0.05, \*\*p&lt;0.01.

**Table 3** Sexual behaviours in the past 3 months among sexually active HIV positive people with one or multiple sex partners

	One partner (n = 247)	Multiple partners (n = 62)	OR (95% CI)
	No (%)	No (%)	
Used substances before sex	59 (24)	21 (34)	1.63 (0.89 to 2.97)
Partner used substances before sex	67 (27)	20 (32)	1.27 (0.70 to 2.33)
100% Condom use	196 (79)	38 (61)	0.28** (0.14 to 0.54)
100% Condom use, steady partner	129 (87)	24 (67)	0.35** (0.15 to 0.82)
100% Condom use, other partners	67 (88)	41 (80)	0.55 (0.21 to 1.47)
	<b>Mean (SD)</b>	<b>Mean (SD)</b>	
Unprotected intercourse	4.2 (23.0)	5.2 (37.1)	1.00 (0.99 to 1.01)
% Condom protected intercourse	93.2 (19.9)	83.6 (29.2)	0.30 (0.08 to 1.05)
% Protected, steady partners	93.1 (19.5)	83.1 (29.5)	0.20* (0.05 to 0.83)
% Protected, non-steady partners	93.7 (20.7)	90.6 (22.3)	0.51 (0.09 to 2.63)

Significance defined as \*p&lt;0.05, \*\*p&lt;0.01.

including not having disclosed HIV to sex partners and less consistent use of condoms. It should be noted that condom use was generally high, exceeding 80% protection, regardless of partner HIV status or having multiple sex partners. A significant minority of people living with HIV/AIDS reported multiple sex partners and these individuals used condoms less with their steady sex partners. One in three participants with multiple sex partners inconsistently used condoms with their steady partners. In addition, people with multiple partners were significantly less likely to have steady partners who were concordant for HIV status. Concurrent steady sex partners are therefore at particularly high risk for HIV transmission. Risks for people with multiple partners are also amplified because these people are less likely to disclose their HIV status.

The current findings should, however, be interpreted in light of the study methodological limitations. The research was conducted in an urban area of Botswana and should not be generalised to other countries in southern Africa or more rural populations. The study is also limited by our use of targeted convenience sampling procedures. Participants were conveniently sampled from HIV related care settings and are therefore not representative of people living with HIV/AIDS in Botswana. People with HIV who are not connected to care are probably different from those who are receiving treatment. It is also important to note that most people infected with HIV are unaware of their HIV status and their sexual partnerships are more likely similar to uninfected people than individuals who know their HIV status.<sup>3</sup> We also relied entirely on self-report within the constraints of a brief face to face interview. Face to face interviews can suppress open and candid responses and therefore produce underestimates of sexual risk behaviours. Our definition of multiple partnerships was based on numbers of sex partners in a brief time frame, leaving open the possibility that partners were actually serially monogamous. Rapidly changing sex partners differs from concurrency, although the implications for HIV transmission are unknown. Finally, the sampling strategy relied on self-reported HIV status among people attending the targeted service venues. With these limitations in mind, we conclude that our findings have implications for interventions with people living with HIV/AIDS in southern Africa.

Sexual risk reduction with people living with HIV is an important prevention strategy.<sup>16</sup> Our findings support the need for HIV prevention with HIV infected people in Botswana, but only for a relatively small number of people who report unprotected intercourse with uninfected and unknown HIV status partners. While we found multiple sex partnerships were not uncommon among sexually active people with HIV, we also found that condom use was generally high. Of far greater concern, however, are the vast majority of HIV infected people

### Key messages

- Multiple and concurrent sexual partners are considered important factors in the rapid spread of HIV in Africa.
- This study reports among the first data on recent multiple sexual partnerships in people who have tested HIV positive in Africa.
- People with HIV who have multiple recent sex partners use condoms less often than individuals with only one recent partner.
- People with HIV who have multiple recent sex partners are less likely to have disclosed their HIV status to their sex partners than individuals with only one recent partner.

who are unaware of their HIV status. HIV positive people who may not be receiving HIV related support and treatment services may also represent a higher risk population than those who are receiving care. In a generalised HIV epidemic, such as that in Botswana, HIV prevention interventions are urgently needed for all people at risk for HIV regardless of whether they have been tested for HIV. Multiple strategies that target at-risk as well as already infected people are therefore urgently needed in sub-Saharan Africa.

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### Authors' affiliations

**Seth C Kalichman**, Department of Psychology, 406 Babbidge Road, University of Connecticut, Storrs, CT 06269, USA  
**Dolly Ntseane, Keitseope Nthomang, Mosarwa Segwabe, Odireleng Phorano**, University of Botswana  
**Leickness C Simbayi**, Human Sciences Research Council, Cape Town, South Africa



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